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Diversification and evolution of the sedimentary system tracts on the Tarfaya Offshore (Moroccan Atlantic Margin) from the Lower Cretaceous to the Tertiary: Tectonic-climatic-eustatic interactions

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The north-western African continental margin and its conjugate the North-Eastern American margin provide a good example of mature passive margins linked to the evolution of the Atlantic Ocean. The Moroccan Margin consists of several coastal and offshore basins filled by sedimentary systems starting with ante-rift Triassic continental red beds which record the different steps of the formation of the ocean. This study concerns the Atlantic margin in the region of Tarfaya located between the latitude 27˚N and 29˚N.

The evolution of this margin segment has been subdivided schematically in 5 principal steps. The opening of the Atlantic was preceded by Triassic-Lower Jurassic rifting which was followed by massive regional subsidence during the middle to late Jurassic and much of the Lower Cretaceous in the Atlantic passive margin. This extension was also responsible of the opening of the Atlas troughs. The middle to late Jurassic is characterized by continental drifting and the installation of the carbonate platform on the high zones often bounded by various structures due to salt tectonics. A Lower Cretaceous thermal subsidence phase is characterized by the first regressive Wealdian-type sequence (El Khatib et al.,1995). The Middle and Upper Cretaceous is only marked by general transgression of eustatic origin, but the transgressive deposits are relatively reduced in the thickness compared to the Jurassic deposits. The Tertiary to the present time characterized by tectonic instability that is linked to the evolution of the Atlas and Rif belts and interferes with glacio-eustatcy starting in the Oligocene

with the Antarctic and Arctic glaciations. This interaction appears by numerous unconformities within the sedimentary series and by a strong North-South differentiation of sedimentary depositional environments.

In the frame of our study we aim to assess the tectonic, the eustatic and the climatic control on the basin-fills based on commercial seismic lines and detailed well log analysis. By exploring the seismic expression of sedimentary successions, we analyse stacking patterns and discontinuities. Sequence boundaries, and intervening sequences allow us to tie the shelf evolution to global (glacio-eustatic) and regional (paleoceanographic, paleoclimatic) changes.